

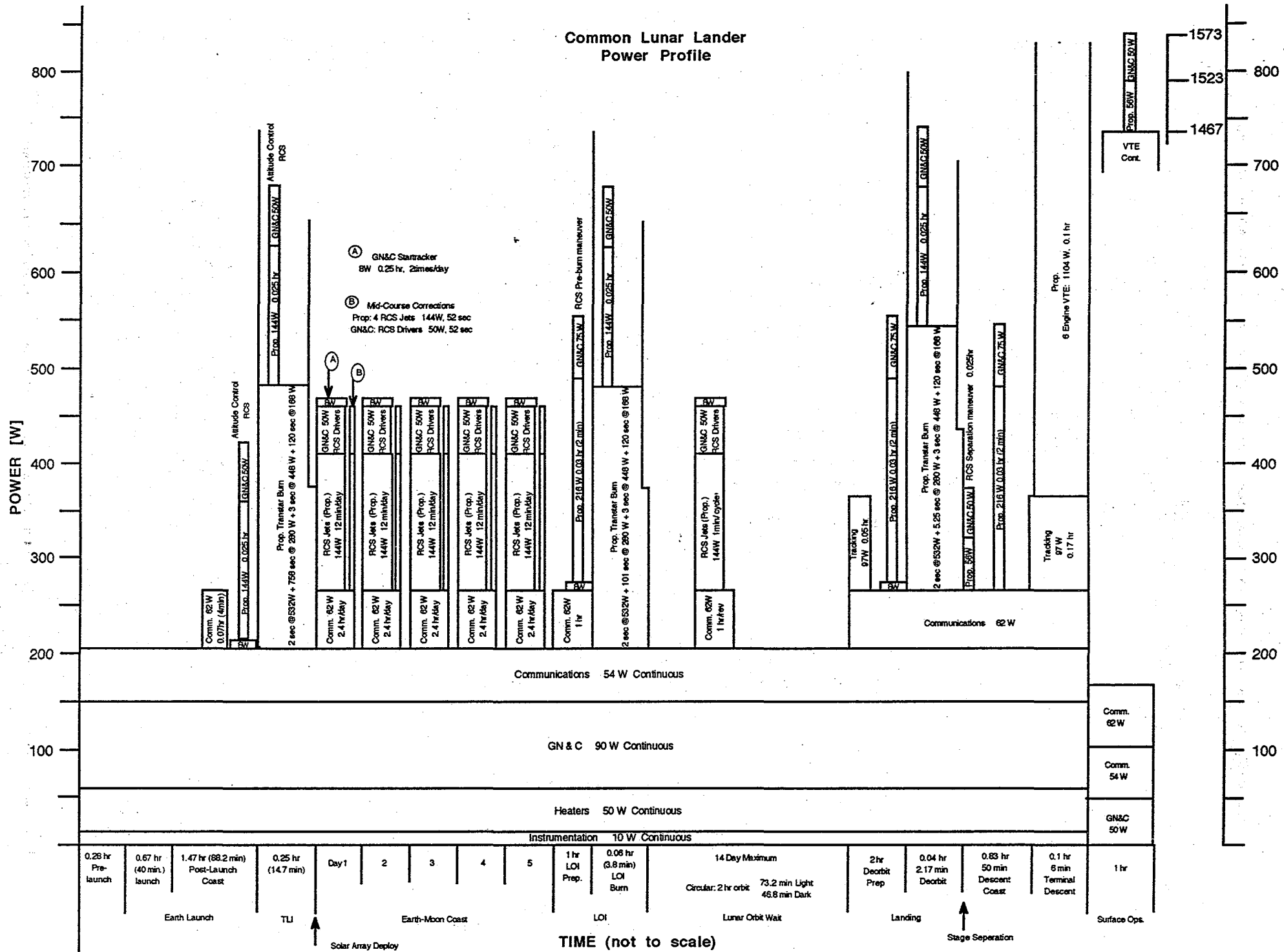
POWER SUBSYSTEM

- **Energy Storage and Power Generation**
- **Electrical Power Distribution and Control**
- **Pyrotechnics**

SUBSYSTEM DESIGN

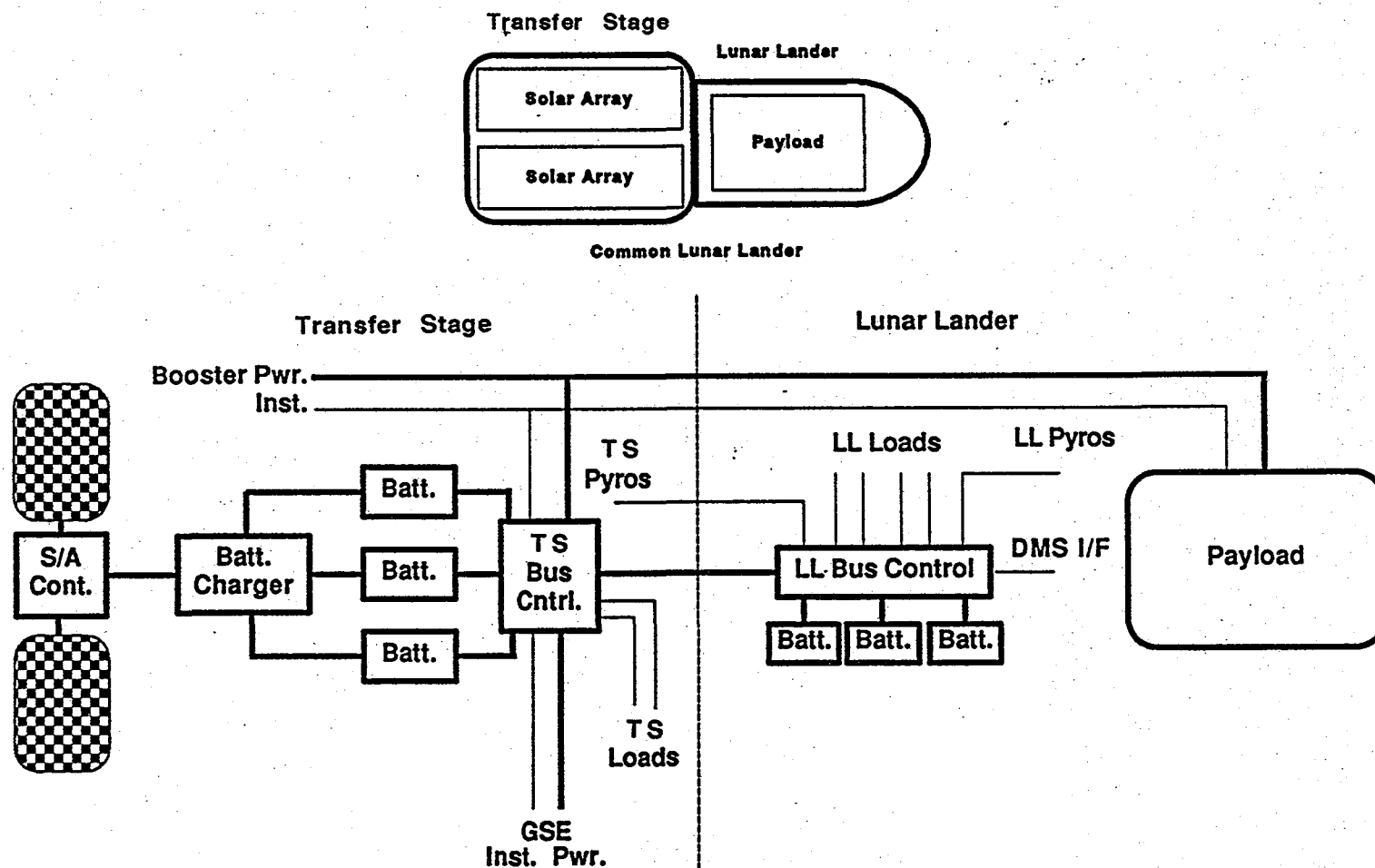
- **Input from other subsystems**
- **Design refinement following vehicle integration**
- **All selected technology is available for a 1996 launch target**

Common Lunar Lander Power Profile

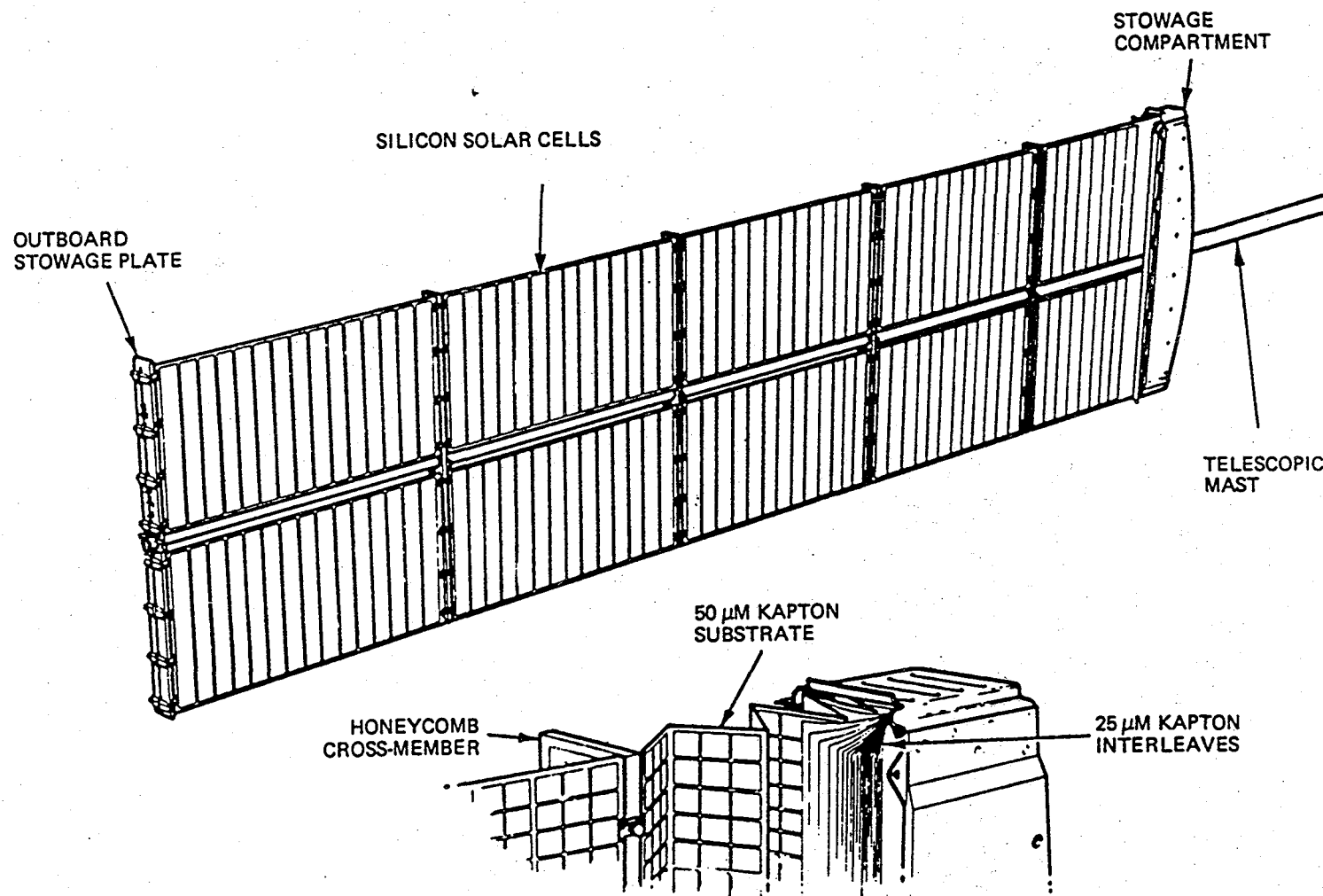


COMMON LUNAR LANDER

Electrical Power System



SOLAR ARRAY EXAMPLE



ENERGY STORAGE AND POWER GENERATION

- **Transfer Stage 47.3 kg**
 - **Silver Zinc Rechargeable Batteries, 3 modules, 11.3 kg total**
 - **Silicon Solar Array, 2 arrays 1.3 m wide x 4 m long, 18 kg each**
 - **Design Drivers**
 - **Batteries sized by Launch to Post-TLI requirement of 570.83 Wh**
 - **Solar array sized by Lunar Orbit power requirement of 769 W**
 - **Power requirement of deorbit prep. larger, but desire to keep solar arrays as small as possible; supplement by using batteries and solar arrays during light since nearing end of transfer stage battery use**
 - **If 100% sunlight in lunar orbit, 24 kg solar array for 527 W**
- **Lander Stage 11.3 kg**
 - **Silver Zinc Batteries, 3 modules**
 - **Design Drivers**
 - **Same battery design as for transfer stage except not recharged**
 - **Use of Silver Zinc provides better match to energy requirements than a specific primary battery, such as lithium thionyl chloride, which requires extra cells in order to meet the peak power current requirement**

ELECTRICAL POWER DISTRIBUTION AND CONTROL

- **28 Vdc \pm 4 Vdc bus**
- **Transfer Stage 45.3 kg**
 - **Transfer Stage Bus Control, Battery Charger, Solar Array Control, Wiring, Connectors, and Installation Hardware**
- **Lander Stage 22.8 kg**
 - **Bus Control, Wiring, Connectors, and Installation Hardware**

PYROTECHNICS

- **Transfer Stage 2.49 kg**
 - **4 Pyro Valves for RCS isolation for propulsion subsystem**
 - **2 Pin Pullers for solar array deployment**
 - **1 Guillotine for severing electric wire bundle prior to stage separation**
 - **4 Explosive Bolts for stage separation**
- **Lander Stage 1.32 kg**
 - **4 Pyro Valves for RCS isolation for propulsion subsystem**
 - **3 Uplock Cutters for landing strut deployment**